

## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : CANON INC

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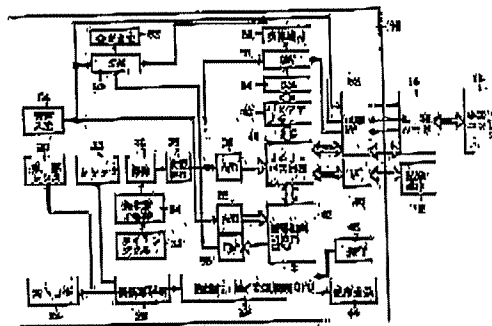
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### (54) PICTURE PROCESSOR

(57)Abstract:

**PURPOSE:** To easily recognize characters from an input picture from a camera.

**CONSTITUTION:** An object document is photographed divisionally in plural areas. An extended card 14 is provided with picture synthesizing function software for synthesis of divided pictures and character recognizing function software which converts character pictures to character codes. A memory bus control circuit 48 is provided with the inter-picture movement detecting function. Plural divisionally photographed pictures are synthesized, and characters are otherwise recognized. Otherwise they are subjected to synthesize the character recognition results of different pictures into a sentence.



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2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

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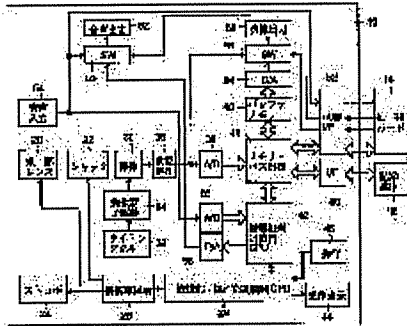
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character codes. A memory bus control circuit 48 is provided with the inter-picture movement detecting function. Plural divisionally photographed pictures are synthesized, and characters are otherwise recognized. Otherwise they are subjected to character recognition and inter- picture movement is referred to synthesize the character recognition results of different pictures into a sentence.

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## CLAIMS

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[Claim(s)]

[Claim 1] The image processing system which characterizes by to have a conversion means change a photographic subject image into an electrical signal continuously, a motion detection means detect a motion of the image in the conversion side of the conversion means concerned, a synthetic means compound two or more images which twist for the conversion means concerned according to the motion detected by the motion detection means concerned, and a character-recognition means

change into a character code the alphabetic character image in the synthetic image compounded by the synthetic means concerned.

[Claim 2] Furthermore, the image processing system according to claim 1 which established a display means to display a photography image that a duplication detection means to detect the duplication part between two or more photography images twisted for the above-mentioned image pick-up means according to the detection result of the above-mentioned motion detection means, and a duplication part and the other part are discriminable.

[Claim 3] Furthermore, the image processing system according to claim 1 made into the object of image composition of the photography image with which it has a comparison means to compare a predetermined value for the detection result of the above-mentioned motion detection means, and the motion beyond the predetermined value concerned has the above-mentioned image composition means.

[Claim 4] Furthermore, the image processing system according to claim 1 with which an amount calculation means of duplications to compute the amount of duplications from a new photography image is provided, and the above-mentioned image composition means carries out image composition of the new photography image concerned when the amount of duplications concerned is beyond a predetermined value.

[Claim 5] Furthermore, it is the image processing system according to claim 2 which has a character spacing detection means to detect character spacing from a photography image, and detects the amount of duplications of the image which should compound the above-mentioned duplication detection means per alphabetic character.

[Claim 6] The image processing system according to claim 1 which the above-mentioned motion detection means searches for the physical relationship of two or more field angles according to the physical

relationship of the reference point of motion detection, and a photography field angle from the movement magnitude and the migration direction of a reference point of [ between photography images ], and the above-mentioned image composition means detects the duplication part of two or more images from the physical relationship between field angles, removes a duplication part, and carries out image composition.

[Claim 7] A conversion means to change a photographic subject image into an electrical signal continuously, and a motion detection means to detect a motion of the image in the conversion side of the conversion means concerned, An alphabetic character signal transduction means to change into text the alphabetic character image contained in each image changed by the conversion means concerned, The image processing system characterized by having an alphabetic character merge means to compound the alphabetic character recognized by the alphabetic character signal transduction means concerned, according to the motion detected by the motion detection means concerned.

[Claim 8] Furthermore, the image processing system according to claim 7 which established a display means to display a photography image that a duplication detection means to detect the duplication part between two or more photography images twisted for the above-mentioned image pick-up means according to the detection result of the above-mentioned motion detection means, and a duplication part and the other part are discriminable.

[Claim 9] The image processing system according to claim 7 with which the above-mentioned alphabetic character merge means has a common section detection means to detect the same character recognition part from the character code data of two or more photography images twisted for the above-mentioned character recognition means, and carries out text composition of the character code data of two or more photography

images based on the detection result of the common section detection means concerned.

[Claim 10] Furthermore, the image processing system according to claim 7 which sets the character recognition result of the photography image with which it has a comparison means to compare a predetermined value for the detection result of the above-mentioned motion detection means, and the motion beyond the predetermined value concerned has the above-mentioned alphabetic character merge means as the synthetic object.

[Claim 11] Furthermore, it is the image processing system according to claim 8 which has a character spacing detection means to detect character spacing from a photography image, and detects the amount of duplications of the image which should compound the above-mentioned duplication detection means per alphabetic character.

[Claim 12] The image processing system according to claim 8 which the above-mentioned motion detection means searches for the physical relationship of two or more field angles according to the physical relationship of the reference point of motion detection, and a photography field angle from the movement magnitude and the migration direction of a reference point of [ between photography images ], the above-mentioned alphabetic character merge means detects the duplication part of the recognition result of two or more images from the physical relationship between field angles, removes a duplication part, and carries out text composition of the character code.

[Claim 13] The image processing system characterized by having a conversion means to have a variable power function and to change an optical image into an electrical signal continuously, an alphabetic character field detection means to detect the alphabetic character field in the optical image concerned, and the control means that operates the

variable power function concerned based on the detection result of the alphabetic character field detection means concerned.

[Claim 14] Furthermore, the image processing system according to claim 13 which has a character-size detection means to detect the graphic size on a photography image, and a distinction means to distinguish whether character recognition is possible from a graphic size, and controls the above-mentioned variable power function in the magnitude which can be recognized at the time of a graphic size in which character recognition is impossible.

[Claim 15] The image processing system according to claim 14 which is expanded to the maximum, and outputs predetermined warning when character recognition is still more nearly improper.

[Claim 16] Furthermore, the image processing system according to claim 13 which has a character-size detection means to detect the graphic size on a photography image, a distinction means to distinguish whether character recognition is possible from a graphic size, and a dilation ratio calculation means to compute the dilation ratio used as the character size in which character recognition is possible.

[Claim 17] Furthermore, the image processing system according to claim 13 which has a character-size detection means to detect the graphic size on a photography image, a distinction means to distinguish whether character recognition is possible from a graphic size, and a dilation ratio calculation means to compute the dilation ratio used as the character size in which character recognition is possible, and displays the photography field angle at the time of the expansion to a photography image with one or more photography images.

[Claim 18] Furthermore, the image processing system according to claim 13 which has a character-size detection means to detect the graphic size on a photography image, a distinction means to distinguish whether

character recognition is possible from a graphic size, and a dilation ratio calculation means to compute the dilation ratio used as the character size in which character recognition is possible, and displays the division photography field by the photography field angle at the time of photomacrography with a photography image.

[Claim 19] Furthermore, the image processing system according to claim 13 which displays the datum line which has a character spacing detection means to detect character spacing from a photography image, and an in-every-direction distinction means to distinguish columnar-writing lateral writing of a photographic subject manuscript from character spacing, and met vertical and horizontal either by the line writing direction of an alphabetic character with a photography image.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to an image processing system.

[0002]

[Description of the Prior Art] In character recognition, conventionally, a printer graphic is first image-data-ized with image input means, such as an image scanner, and an alphabetic character image is changed into a character code with the character recognition software on a computer after that. As an image input means, there is a digital electronic camera other than an image scanner. The digital electronic camera is suitable, when a printing side is not superficial, or when carrying out the image input of the big thing which cannot be read by the image scanner.

[0003]



[Problem(s) to be Solved by the Invention] When using a digital electronic camera as an image input means for character recognition, a graphic size [ in / with a natural thing / a photography image ] must be large to extent in which character recognition is possible. In order to photo an alphabetic character in the magnitude in which character recognition is possible, when dividing a photographic subject manuscript into multiple times and photoing it, after capturing two or more images and carrying out character recognition of each image, text editing of each character recognition result will be carried out to original sequence with a word processor, and there is a fault of taking complicated actuation and great time amount.

[0004] This invention aims at showing the image processing system which cancels such un-arranging.

[0005] This invention aims at offering the image processing system which raised operability again.

[0006] This invention aims at offering further the image processing system which raised the precision of character recognition.

[0007]

[Means for Solving the Problem] A conversion means by which the image processing system concerning the 1st invention changes a photographic subject image into an electrical signal continuously, A motion detection means to detect a motion of the image in the conversion side of the conversion means concerned, It is characterized by having a synthetic means to compound two or more images twisted for the conversion means concerned, and a character recognition means to change into a character code the alphabetic character image in the synthetic image compounded by the synthetic means concerned, according to the motion detected by the motion detection means concerned.

[0008] A conversion means by which the image processing system

concerning the 2nd invention changes a photographic subject image into an electrical signal continuously, A motion detection means to detect a motion of the image in the conversion side of the conversion means concerned, It is characterized by having an alphabetic character signal transduction means to change into text the alphabetic character image contained in each image changed by the conversion means concerned, and an alphabetic character merge means to compound the alphabetic character recognized by the alphabetic character signal transduction means concerned according to the motion detected by the motion detection means concerned.

[0009] The image processing system concerning the 3rd invention has a variable power function, and is characterized by having a conversion means to change an optical image into an electrical signal continuously, an alphabetic character field detection means to detect the alphabetic character field in the optical image concerned, and the control means that operates the variable power function concerned based on the detection result of the alphabetic character field detection means concerned.

[0010]

[Function] The correspondence to the manuscript of the magnitude of arbitration is attained by adding a character recognition function to image pick-up equipment. Moreover, since the graphic size of a photographic subject manuscript is detected at the time of photography, it distinguishes whether character recognition is possible and it carries out photomacrography to the magnitude which can be recognized suitably, a recognition rate can be raised. Furthermore, since the physical relationship between two or more images accompanying a motion of a photography image is detected at any time and two or more images or the recognition result of those is image-compounded or text

compounded based on a detection result, it is not necessary to carry out complicated actuation.

[0011]

[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing.

[0012] Drawing 1 shows the outline configuration block Fig. of one example of this invention. In drawing 1, 10 is an expansion card in which the body of a digital electronic camera and 12 possess the record media (memory card or a hard disk drive unit of PCMCIA specification etc.), and 14 possesses a character recognition function. An expansion card 14 can connect or communicate also with a host computer 16.

[0013] In the body 10 of a camera, CPU by which the diaphragm combination shutter which a taking lens and 22 extract 20 and serves both as a function and a shutter function, and 24 control a stroboscope, and 26 controls the device section and a control unit, and 28 are drive circuits which drive the device section. The image sensor from which 30 changes the optical image of the photographic subject by the taking lens 20 into an electrical signal, The timing signal generating circuit which generates a timing signal required in order that 32 may operate an image sensor 30, The image sensor drive circuit where 34 drives an image sensor 30 according to the timing signal from the timing signal generating circuit 32, The front-end processing circuit equipped with the nonlinear amplifying circuit which carries out nonlinear magnification before the CDS circuit where 36 removes a noise from the output of an image sensor 30, and A/D conversion, and 38 are A/D converters which change the analog output of the front-end processing circuit 36 into a digital signal. CPU for signal-processing system control by which 40 controls buffer memory and 42 controls each signal-processing section, the actuation display with which 44 displays the information for actuation

assistance and the condition of a camera, and 46 are the operating sets for controlling the body 10 of a camera from the outside. 48 is a memory bus control circuit which controls a transfer of image data and voice data, and possesses the function to also detect a motion vector at the time of a seriography, in this example while it controls writing and read-out of buffer memory 40.

[0014] The interface whose 50 connects a record medium 12 to a body 10, and 52 are extended interfaces which connect an expansion card 14.

[0015] The A/D converter which 54 digitizes voice input circuits, such as a microphone, and 56 digitizes the analog output of the voice input circuit 54, and is impressed to CPU42 for signal-processing control, the D/A converter with which 58 analog-izes the digital sound signal from CPU42 for signal-processing control, and 60 are switches which choose the sound signal from the output of the voice input circuit 54, the output of D/A converter 58, or the extended interface 52, and are impressed to an audio output device 62. Although an audio output device 62 is generally a loudspeaker, you may be a voice output terminal. The D/A converter which changes into an analog video signal the image data 64 is remembered to be by buffer memory 38, and 66 are switches which choose the video-signal output of the front-end processing circuit 36, the video-signal output of D/A converter 64, or the video signal from an expansion card 52, and are impressed to the image output unit 68. Although the image output unit 68 is generally a graphic display device, you may be an image output terminal.

[0016] Drawing 2 shows the outline configuration block Fig. inside an expansion card 14. For an image pick-up digital disposal circuit and 74, as for buffer memory and 78, an infanticide processing circuit and 76 are [ 70 / an expansion bus interface (I/F) and 72 / a bus controller and 80 ] external I/F controllers. The D/A converter from which an animation

compression expansion circuit and 84 change the image data from buffer memory 76 into a video encoder, and 82 changes 86 into an analog signal, the A/D converter with which 88 digitizes the analog sound signal from the body 10 of a camera, and 90 are D/A converters which change into an analog signal the voice data which should be outputted to the body 10 of a camera. The program RAM the RISC mold CPU in which a high-speed operation of 92 is possible, and 94 remember the program of the RISC mold CPU 92 of operation to be, and 96 are flash ROMs which memorize BIOS of the RISC mold CPU 92.

[0017] First, the original actuation as a digital electronic camera is explained briefly. When a photography person does actuation predetermined with an operating set 46, it will be in the condition which can be photoed and the device section and CPU26 for control unit control will control a lens system in the condition according to an intention of a photography person through the drive circuit 28. Under the present circumstances, photography conditions etc. are displayed on the actuation display 44, and the situation of a camera is told to a photography person. A non-illustrated photometry circuit measures the brightness of a photographic subject, the device section and CPU26 for control unit control compute the drawing value and shutter speed of the diaphragm combination shutter 22 according to this measured value, the drive circuit 28 extracts according to that calculation value, and the combination shutter 22 is driven. Moreover, a stroboscope 24 is made to emit light as a photography fill-in flash depending on a photometry result.

[0018] An image sensor 30 changes a taking lens 20 and the optical image of the photographic subject by the diaphragm combination shutter 22 into an electrical signal. When interlace read-out mold CCD series is used as an image sensor 30, it can prevent that light carries out incidence and has a bad influence during a transfer at a signal charge by

forming the diaphragm combination shutter 22. The drive circuit 34 amplifies the output of the timing signal generating circuit 32, and drives an image sensor 30. In addition, the timing signal generating circuit 32 is controlled by CPU42 for signal-processing control.

[0019] Thus, the output of the driven image sensor 30 is inputted into the front-end processing circuit 36. While CDS processing removes the low-pass noise contained in the output of an image sensor 30, nonlinear processing of the front-end processing circuit 36 is carried out so that the dynamic range of A/D converter 38 can be used effectively. The output of the front-end processing circuit 36 is changed into a digital signal by A/D converter 38, and is impressed to the memory bus control circuit 48.

[0020] Under control of CPU42 for signal processing, the memory bus control circuit 48 is read in order of predetermined [ which is decided by the color filter configuration of an image sensor 30 etc. ], once accumulating the output of A/D converter 38 in buffer memory 40. The read photography image data is impressed and recorded on a record medium 12 through an interface 50.

[0021] Next, characteristic actuation of this example is explained. In this example, character recognition functional software and image composition functional software are written in the program RAM 94 of an expansion card 14 through the external-interface controller 80 from a host computer 16. Although the RISC mold CPU is used as a processor in which a high-speed operation is possible, of course, other processors, such as the CISC mold CPU, may be used.

[0022] Drawing 3 and drawing 4 show the operation flow chart of the device section and CPU26 for control unit control controlled by the objects CPU42 and CPU42 for signal-processing control in this example as a whole. Actuation of this example is explained with reference to

drawing 3 and drawing 4 .

[0023] While photography begins (S1) and moving a lens system to a wide edge first by actuation of photography initiation of a photography person (S2), the document field of a photographic subject image is extracted (S3). As a result of the extract of a document field, zooming is carried out until it controls (S4) and a lens system and either of vertical fills an image pick-up side horizontally [ an alphabetic character field ], when it distinguishes whether a document field exists over the whole surface of an image pick-up side and (S4) and an alphabetic character field remain in a part of image pick-up side (S10-S13, S6-S8). It specifically expands so that an alphabetic character field may fill with a longitudinal direction first (S10), and it judges whether it is the magnitude which can be recognized (S11). A photography image will be memorized if recognition is possible (S14). As shown in drawing 5 , to the manuscript, the photography image memorized here is relation like the image pick-up side A, and contains the whole photographic subject document.

[0024] When it cannot recognize by S11, a lens system is controlled, and zooming is carried out so that a character string may fill an image pick-up side with the direction of a short hand (S12). It distinguishes whether the graphic size of the photography image of the result can be recognized (S13). An image will be memorized if recognition is possible as a result of distinction (S13) (S9). The image memorized here has relation like the image pick-up side B to the manuscript, as shown in drawing 5 .

[0025] Moreover, when the extracted document field is crossing all over the image pick-up side, it judges whether character recognition is possible from (S4) and a graphic size (S5), and a photography image will be memorized if recognition is possible (S39). The image memorized

here is a thing like the image pick-up side C containing some manuscripts, as shown in drawing 5 .

[0026] Since the image memorized by S9 contains some photographic subject manuscripts, it investigates whether actuation of forbidding photography of the remaining document is made (S15). If actuation of the ban on photography is not made, (S9) and photography are continued, the direction which the camera moved by the motion vector of a photography image, and movement magnitude are detected (S16), and the physical relationship of the image currently photoed at present to the image memorized in the last process is searched for. It displays so that a finder or a monitor may understand a duplication part for the part already memorized in the before process among the present photography images with a photography image from the physical relationship searched for (S17).

[0027] As the detection approach of a duplication part, it is performed as follows, for example. That is, as shown in drawing 6 , the positional information to the boundary line which determines two or more attention pixels of the division fields (a, b, c, d) and the field angle of an image pick-up side for motion detection after carrying out field division of the inside of a photography image is memorized beforehand. As shown in drawing 7 , the movement magnitude and the migration direction (for example, from a to a' and from b to b') of an attention pixel of [ between two or more images (the 1st photography image and 2nd photography image) ] are computed, the physical relationship of the field angle boundary line between two or more images is searched for, and the part ( drawing 7 shadow area) surrounded by the field angle boundary line between images is made into a duplication part.

[0028] Then, S16-S8 are repeated until it carries out image composition of the image memorized in the last process, and the newly photoed



image so that physical relationship and a duplication part may be connected, and it memorizes or records the synthetic image (S18) and the remainder of a document is lost (S15).

[0029] If an alphabetic character image required for character recognition is captured (S13 or S15), character recognition of the image memorized by S14 or S18 will be performed (S19). According to directions of a user, a character recognition result is recorded on a record medium 12, or is outputted outside by the external interface.

[0030] In addition, when a lens system arrives at a tele edge before becoming large, by the time it had recognized the graphic size (S6), it warns of a recognition impossibility and approach for a photographic subject is demanded from a user (S21).

[0031] It will end, if there is actuation which ends the character recognition of a photographic subject (S22).

[0032] In this example, since image composition of the photography image is carried out at any time, the amount of positional information between the images for composition decreases comparatively, and it is effective in the location management between images becoming easy.

[0033] Drawing 8 and drawing 9 show the 2nd operation flow chart of this example.

[0034] While photography begins (S31) and moving a lens system to a wide edge first by actuation of photography initiation of a photography person (S32), the document field of a photographic subject image is extracted (S33). When it distinguishes whether a document field exists over the whole surface of an image pick-up side as a result of the extract of a document field (S34) and an alphabetic character field remains in a part of image pick-up side (S34), zooming is carried out until it controls a lens system and either of vertical fills an image pick-up side horizontally. [ an alphabetic character field ] (S42-S47, S37-S40). It specifically

expands so that an alphabetic character field may fill with a longitudinal direction first (S42), and character recognition is performed in the condition (S43), and it distinguishes whether character recognition is possible (S44), and a recognition result will be memorized if recognition is possible (S48). In drawing 5 , to the manuscript, the recognition result memorized here is relation like the image pick-up side A, and has brought a recognition result of the whole photographic subject document. [0035] When it cannot recognize by S44, a lens system is controlled, and zooming is carried out so that a character string may fill an image pick-up side with the direction of a short hand (S45). Character recognition is performed in the condition (S46), and it distinguishes whether character recognition is possible (S47). A recognition result will be memorized if recognition is possible (S41). The recognition result memorized here is what carried out character recognition of the image pick-up side B over a manuscript, as shown in drawing 5 .

[0036] Moreover, when the extracted document field is crossing all over the image pick-up side (S34), it remains as it is, character recognition is performed (S35), and it judges whether character recognition is possible (S36). A recognition result will be memorized if recognition is possible (S41). The recognition result memorized here has brought some recognition results of a manuscript, as shown in drawing 5 as an image pick-up side C.

[0037] Since the recognition result memorized by S41 consists of some photographic subject manuscripts, it investigates whether actuation of forbidding photography of the remaining part is made (S49). If actuation of the ban on photography is not made (S49), photography is continued, the direction which the camera moved by the motion vector of a photography image, and movement magnitude are detected (S50), and the physical relationship of the image currently photoed at present to the

image which carried out character recognition to just before is searched for. A photography image is displayed on a finder or a monitor so that the physical relationship searched for may show clearly a duplication part with the part by which character recognition has already been carried out in the before process among the present photography images (S51).

[0038] Character recognition of the image currently photoed at present is performed (S52), and if there is a part which overlaps between the recognition result memorized in the last process and the newly obtained recognition result, a duplication part will be deleted from the newly obtained recognition result (S53). For example, as shown in (A) of drawing 10 , there is migration from the 1st photography to the 2nd photography, and it asks for the part surrounded by the boundary line between two or more images as drawing 6 and drawing 7 explained. As the recognition result of the 1st photography and the recognition result of the 2nd photography show drawing 10 (B), respectively, supposing it is obtained, the information on a duplication part will be added to each recognition result. If a duplication alphabetic character is deleted from a new recognition result, there is no recognition alphabetic character which remained and return (S54) and the recognition alphabetic character which remained are in S49 (S54), the remaining recognition alphabetic characters will be compounded to the recognition result obtained in the last process. The information on a duplication part is used at the time of this composition, and it compounds so that it may be correctly connected as a text. For example, a synthetic result comes to be shown in drawing 10 (C) to drawing 10 (B).

[0039] If all the character recognition of a photographic subject manuscript is completed (S48 or S49), according to directions of a user, a recognition result will be recorded on a record medium 12, or will be outputted outside by the external interface.

[0040] In addition, when a lens system arrives at a tele edge before becoming large like the case of drawing 3 , by the time it had recognized the graphic size (S37), it warns of a recognition impossibility and approach for a photographic subject is demanded from a user (S57).

[0041] It will end, if there is actuation which ends the character recognition of a photographic subject (S58).

[0042] Since character recognition of the captured alphabetic character image is carried out to at any time, data will be high-compressed substantially, and there is little data storage capacity in a system, and it can be managed with the actuation shown in drawing 8 and drawing 9 . When it puts in another way, there is an advantage that a lot of data can be treated.

[0043] Change as a result of [ in S9-S18 in drawing 4 and drawing 9 ] the photography image in S41-S55, a storage image, or as a result of [ character recognition ] is explained with reference to drawing 11 - drawing 16 . The alphabetic character field (A) drawing 11 is a manuscript and according [ drawing 12 ] to the 1st photography, its storage image, or a recognition result (B), The alphabetic character field (A) according [ drawing 13 ] to the 2nd photography, its storage image, or a recognition result (B), The alphabetic character field (A) according [ the alphabetic character field (A) according / drawing 14 / to the 3rd photography, its storage image or a recognition result (B), and drawing 15 ] to the 4th photography, its storage image or a recognition result (B), and drawing 16 show a collection storage image or a recognition result.

[0044] When the alphabetic character field part inputted by the 1st photography shows drawing 12 (A) to the manuscript shown in drawing 11 , the photography image or recognition result memorized is the same as drawing 12 (A), as shown in drawing 12 (B), noting that there is no character recognition error. a duplication part becomes worse for a while,

and in the 2nd photography, it overlaps in part from the 1st photography, and right-hand side is photoed, and as shown in a finder or a monitor at drawing 13 (A), it is displayed (or it colors -- having). By this 2nd photography, a storage image or a recognition result becomes like drawing 13 (B). In drawing 13 (B), the image (or recognition result) part by pre- photography (1st photography) is surrounded by the dotted line so that intelligibly. The new image (or new character recognition result) obtained by the 2nd photography is compounded following the part enclosed with a dotted line.

[0045] Similarly, an image as shown in a finder or a monitor at drawing 14 (A) is displayed by the 3rd photography, and a synthetic image or a recognition result comes to be shown in drawing 14 (B) by it. An image as shown in a finder or a monitor at drawing 15 (A) is displayed by the 4th photography, and a synthetic image or a recognition result comes to be shown in drawing 15 (B) by it. Drawing 14 (B) and drawing 15 (B) also surround the synthetic image or recognition result of a just before by the dotted line, and are shown.

[0046] A final synthetic image or a recognition result becomes the same as the manuscript which comes to show to drawing 16 and is shown in drawing 11 .

[0047] Drawing 17 and drawing 18 show the 3rd operation flow chart of this example as a whole.

[0048] By actuation of photography initiation of a photography person, photography begins (S61) and a lens system is first moved to a wide edge (S62). A document field is extracted from a photographic subject image (S63), and columnar writing or lateral writing is distinguished (S64). The usual document opens line spacing, and is written and a line writing direction agrees to a large purport horizontal direction or a perpendicular direction to an image pick-up side. What is necessary is to

be horizontal or perpendicular and just to let the direction with few degrees where a signal component changes be a line writing direction as the distinction approach of columnar-writing lateral writing, for example. Then, the photography field angle which becomes the magnitude in which character recognition is possible from the graphic size on a photography image, a field angle rate, and its order of photography are displayed on a finder or monitor display (S65). For example, to the manuscript shown in drawing 19 , as shown in drawing 20 , a photography field angle, a field angle rate, and its order of photography are displayed.

[0049] If it becomes the magnitude which can be recognized before controlling to a lens system call-side to become the field angle and photographic coverage which were set up by S65 (S66) and arriving at a tele edge (S67), as a dotted line shows a photography character row so that it may become in parallel horizontally [ it is right and / an image pick-up side ] or vertically, 1 or the two or more datum lines will be displayed on a finder or a monitor at drawing 21 . Whether the datum line is drawn perpendicularly or it lengthens horizontally follow the result of having carried out columnar writing and lateral-writing detection by S64. Moreover, although spacing of the datum line is set up according to line spacing when drawing two or more datum lines, the datum-line spacing is also set up by the detection result of S64. Thereby, a document field can be photoed so that a character row may become horizontal or vertical within a photography image.

[0050] The address (2-dimensional coordinate) of the memory which memorizes the positional information of two or more images is reset (S71), the first photography image is memorized (S72), and the address (2-dimensional coordinate location) of the image is memorized (S73).

[0051] Photography will be continued, if it distinguishes whether

directions which do not continue and photo the remaining document (or field) are made (S74) and there are no directions of a photography termination. That is, the image, the movement magnitude of photography drawing current from current photography drawing, and the migration direction which were memorized in the last process are detected (S75). If it distinguishes whether the specified quantity whose movement magnitude and migration direction which were detected are the threshold judged that a new image will be captured is reached (S76) and movement magnitude has not reached the specified quantity, the loop formation of S74, S75, and S76 is carried out, and it will be in a waiting state until movement magnitude reaches a predetermined value. (S76) and a new image will be captured for movement magnitude beyond the predetermined value at a certain time. The superposition part of the present photography image and a storage image is displayed from the detection result of movement magnitude and the migration direction (S77). Since there is a possibility that an image may be uncompoundable by suitable physical relationship when there are few parts which distinguish and (S78) lap [ whether there is any amount (for example, the numbers of trains, and a line count or the numbers of alphabetic characters, such as a character string) of a superposition part beyond a predetermined value and ], it moves, warns of \*\*\*\* (S79), and returns to S74. When there is a lap of the specified quantity (S78), the positional information over the image photoed [ movement magnitude and ] from migration just before is counted as the image address (S80), an image is memorized to the address (S81), and the image address is memorized (S82).

[0052] Photography actuation will be suspended if there are directions of a photography termination of the remaining document (S74). When the inside of a paddle with two or more images memorized by the last

process is distinguished (S83) and two or more images exist, those images are compounded according to each image address (S84). In accordance with fixed criteria, as the duplication part of an image was explained previously, it is deleted. Character recognition is performed to a synthetic image or a single image (S85), and a recognition result is recorded on a record medium (S86).

[0053] When photoing a manuscript other than the manuscript photoed in the last process, it progresses to S62 and the above-mentioned process is repeated (S87), and when that is not right, it ends.

[0054] In the actuation shown in drawing 17 and drawing 18 , since the need of carrying out division photography of the manuscript, its field angle, the count of photography, and photography sequence are displayed, a user is effective in the ability to grasp visually and easily photographic coverage, the order of photography, etc. of a manuscript which are a photographic subject. Moreover, a user can photo a photographic subject manuscript so that a text line may become horizontal or vertical, and it becomes easy to attain the high rate of character recognition by performing columnar writing and lateral-writing distinction of a document, and displaying the datum line according to the distinction result. Since an image is not captured when the movement magnitude of two or more images question is below the specified quantity, there is little image or recognition result data storage capacity, and it ends. By maintaining the amount of duplications between images more than the specified quantity, the information for composition increases and image composition can be carried out more at accuracy. By making an alphabetic character into a unit for the movement magnitude and the amount of duplications between images, it becomes the synthetic processing corresponding to human being's decision criterion, and a feeling of use improves.



[0055]

[Effect of the Invention] According to invention concerning this application, the operability of character recognition can be improved and recognition precision can be raised so that he can understand easily from the above explanation. Furthermore, it is in the distance of arbitration from a photographic subject manuscript, and the character recognition of the photographic subject manuscript of the magnitude of arbitration becomes possible. Moreover, when a user incorporates a photographic subject manuscript, capture an image depending on a natural way of moving like whether an alphabetic character is followed by viewing, it becomes unnecessary to be anxious to the method of scanning for an image input, and user-friendliness becomes good.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the outline configuration block Fig. of one example of this invention.

[Drawing 2] It is an outline configuration block Fig. inside the expansion card 14 of drawing 1 .

[Drawing 3] It is a part of 1st operation flow chart of this example.

[Drawing 4] It is a part of 1st operation flow chart of this example.

[Drawing 5] It is the explanatory view of the relation between a manuscript and photographic coverage (or image of an image pick-up side).

[Drawing 6] It is the explanatory view of the attention pixel in a field angle.

[Drawing 7] It is the explanatory view of the movement magnitude in two photography, and the migration direction.

[Drawing 8] It is a part of 2nd operation flow chart of this example.

[Drawing 9] It is a part of 2nd operation flow chart of this example.

[Drawing 10] It is the explanatory view of the synthetic process of the character recognition result in the actuation shown in drawing 8 and drawing 9 .

[Drawing 11] It is an example of a photographic subject manuscript.

[Drawing 12] It is as a result of [ by the 1st photography to the manuscript shown in drawing 11 ] a photography image, a synthetic image, or as a result of [ recognition ].

[Drawing 13] It is as a result of [ by the 2nd photography to the manuscript shown in drawing 11 ] a photography image, a synthetic image, or as a result of [ synthetic recognition ].

[Drawing 14] It is as a result of [ by the 3rd photography to the manuscript shown in drawing 11 ] a photography image, a synthetic image, or as a result of [ synthetic recognition ].

[Drawing 15] It is as a result of [ by the 4th photography to the manuscript shown in drawing 11 ] a photography image, a synthetic image, or as a result of [ synthetic recognition ].

[Drawing 16] It is as a result of [ to the manuscript shown in drawing 11 ] a final synthetic image or as a result of [ synthetic recognition ].

[Drawing 17] It is a part of 3rd operation flow chart of this example.

[Drawing 18] It is a part of 3rd operation flow chart of this example.

[Drawing 19] It is an example of a photographic subject manuscript.

[Drawing 20] It is the example of a field angle standard display of S65.

[Drawing 21] It is the example of a datum-line display of S70.

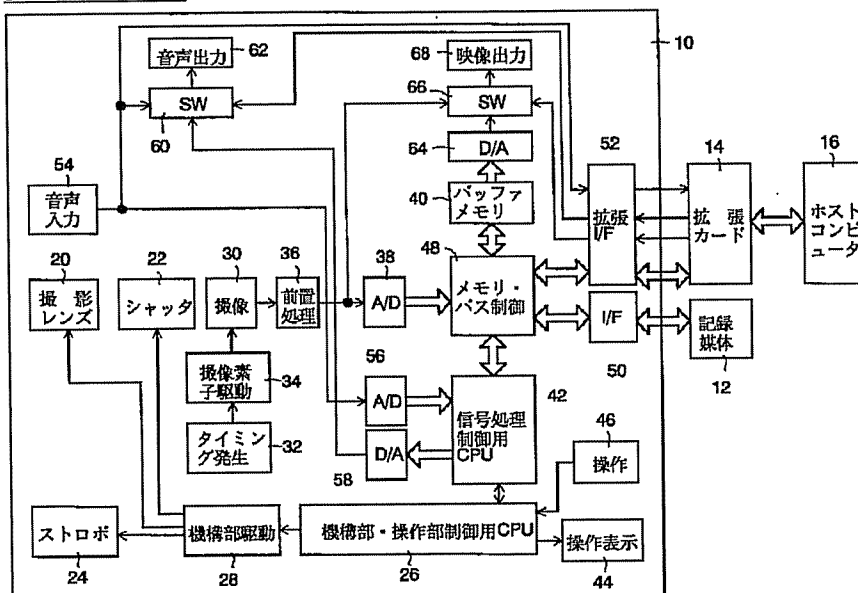
[Description of Notations]

10: body of a digital electronic camera 12: -- record medium 14: -- expansion card 16: -- host computer 20: -- taking lens 22: diaphragm combination shutter 24: Stroboscope 26 : [ The device section and the

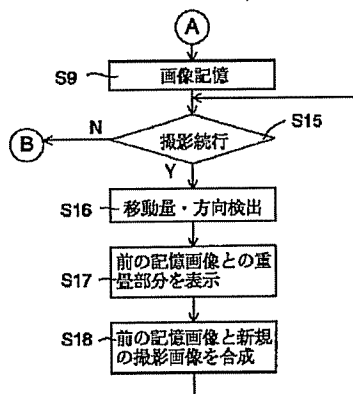
control unit control CPU ] 28:device section drive circuit 30: -- image sensor 32:timing signal generating circuit 34:image sensor drive circuit 36:front-end processing circuit 38: -- A/D converter 40: Buffer memory 42 : [ CPU for signal-processing system control ] 44:actuation display 46: -- operating set 48:memory bus control circuit 50: -- interface 52:escape interface 54:voice input circuit 56: -- A/D converter 58: -- D/A converter 60: -- switch 62: -- audio output device 64:D/A-converter 66: -- switch 68:image output unit 70:expansion bus interface 72:image pick-up digital disposal circuit 74:infanticide processing circuit 76: -- buffer memory 78: -- bus controller 80:external I/F controller 82:animation compression expansion circuit 84:video encoder 86:D/A-converter 88: -- A/D converter 90: -- D/A converter 92:RISC mold CPU 94:program RAM 96: -- flash ROM

## DRAWINGS

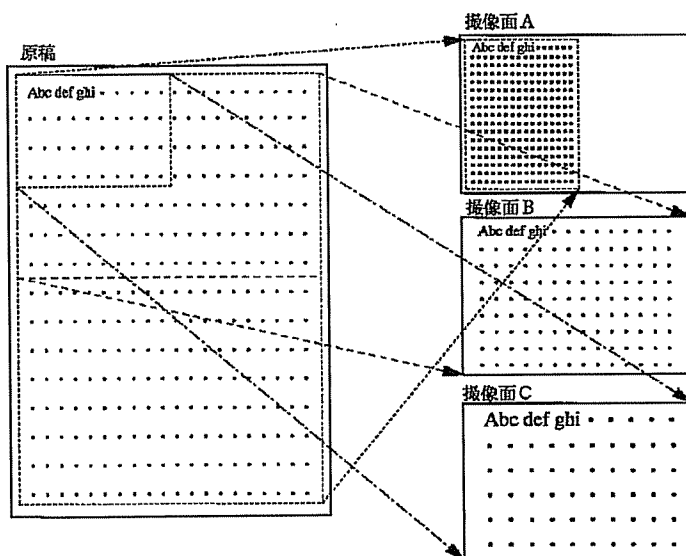
[Drawing 1]



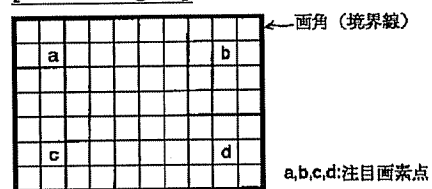
[Drawing 4]



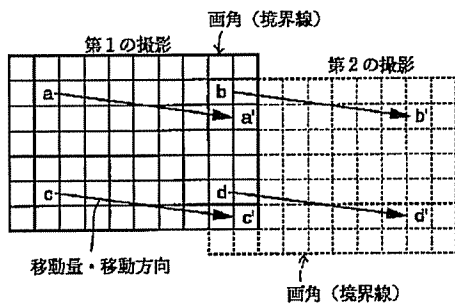
[Drawing 5]



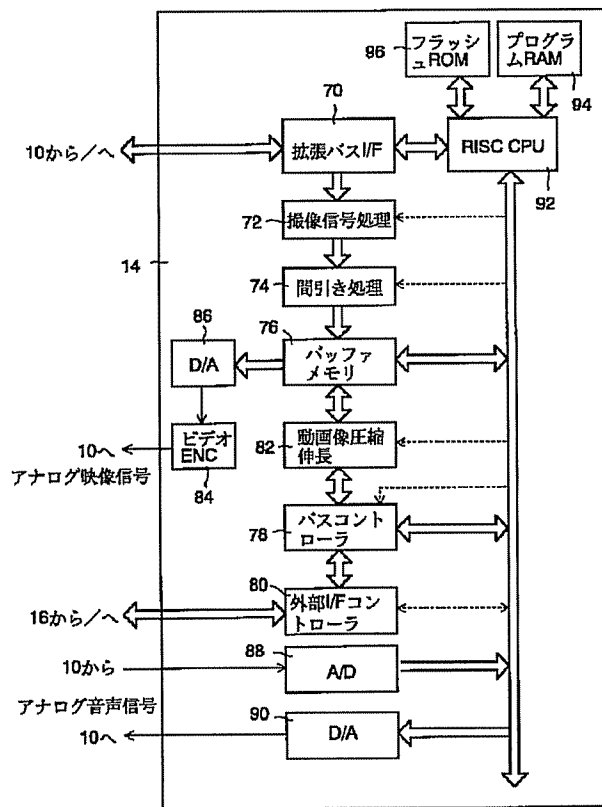
[Drawing 6]



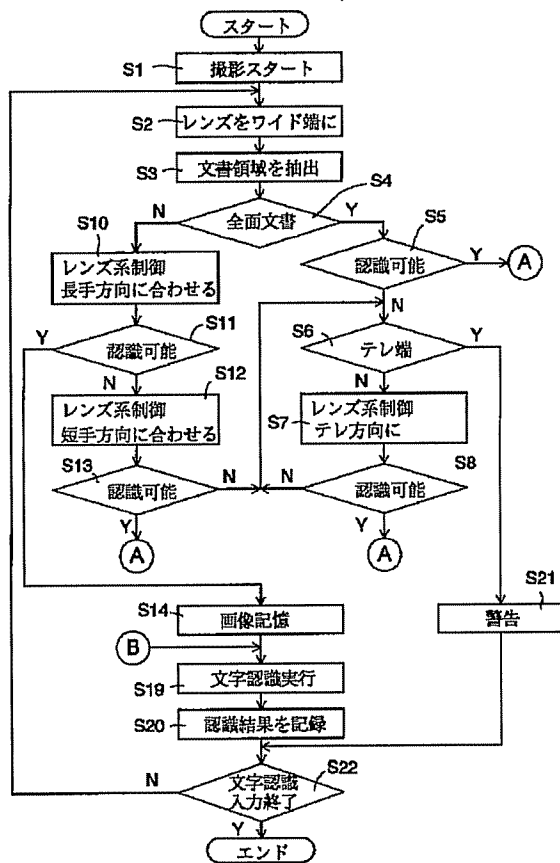
[Drawing 7]



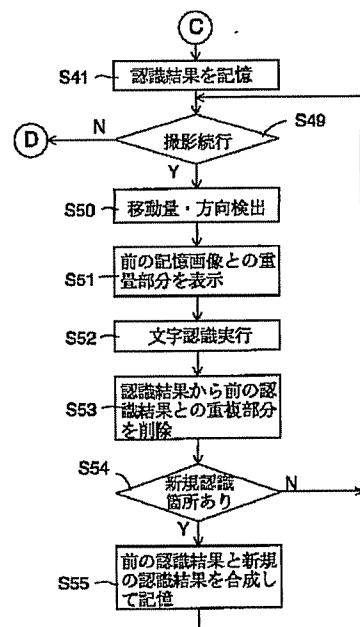
[Drawing 2]



[Drawing 3]



[Drawing 9]

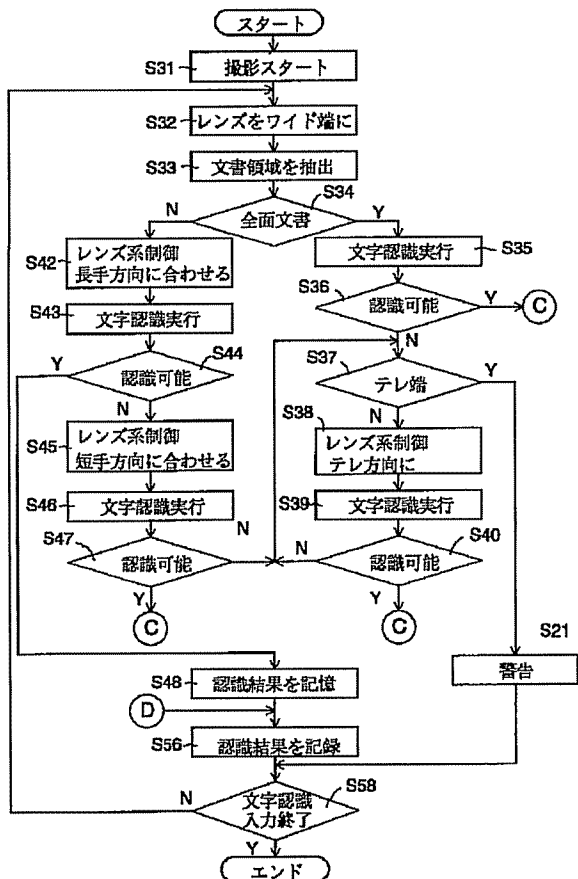


[Drawing 11]

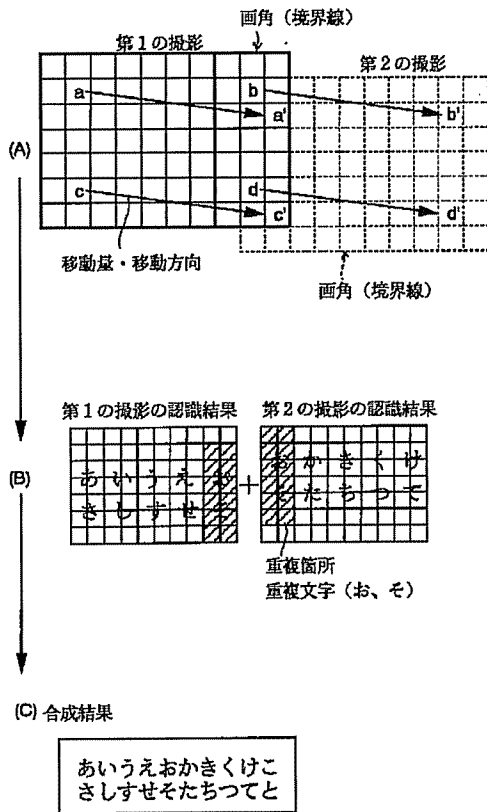
原稿

あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ  
まみむめもやいうえよらりるれろわゐうゑをあいうえおかきくけこ  
さしすせそたちつてとなにぬねのはひふへほまみむめもやいうえよ  
らりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてと  
なにぬねのはひふへほまみむめもやいうえよらりるれろわゐうゑを  
あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ  
まみむめもやいうえよらりるれろわゐうゑをあいうえおかきくけこ  
さしすせそたちつてとなにぬねのはひふへほまみむめもやいうえよ  
らりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてと  
なにぬねのはひふへほまみむめもやいうえよらりるれろわゐうゑを  
.....  
.....

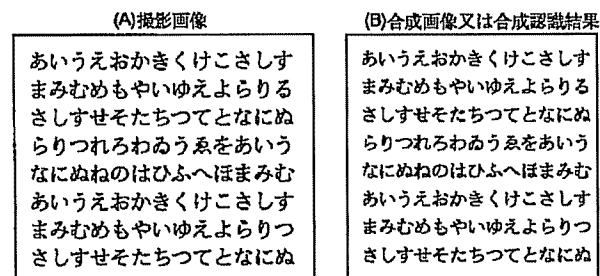
[Drawing 8]



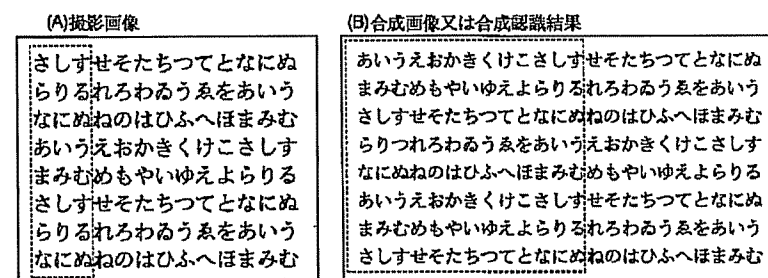
[Drawing 10]



## [Drawing 12]

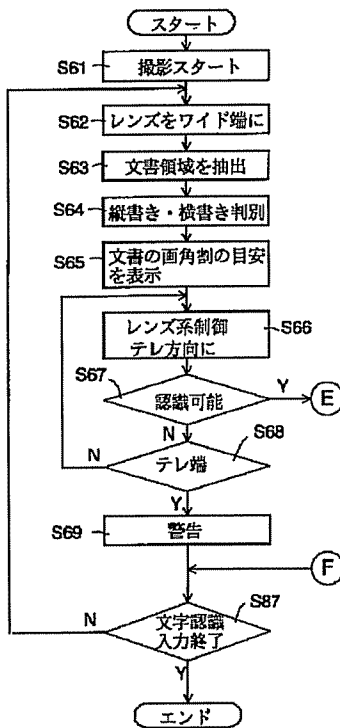


## [Drawing 13]





[Drawing 17]



[Drawing 14]

(A)撮影画像	(B)合成画像又は合成認識結果
<p>つてとなにぬねのはひふへほ うゑをあいいうえおかきくけこ ふへほまみむめもやいうえよ くけこさしすせそたちつと ゆえよりるれろわゐうゑお つてとなにぬねのはひふへほ うゑをあいいうえおかきくけこ ふへほまみむめもやいうえよ</p>	<p>あいいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ まみむめもやいうえよりるれろわゐうゑをあいいうえおかきくけこ さしすせそたちつてとなにぬねのはひふへほまみむめもやいうえよ よりつれろわゐうゑをあいいうえおかきくけこさしすせそたちつてと なにぬねのはひふへほまみむめもやいうえよりるれろわゐうゑお あいいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ まみむめもやいうえよりるれろわゐうゑをあいいうえおかきくけこ さしすせそたちつてとなにぬねのはひふへほまみむめもやいうえよ</p>

[Drawing 15]

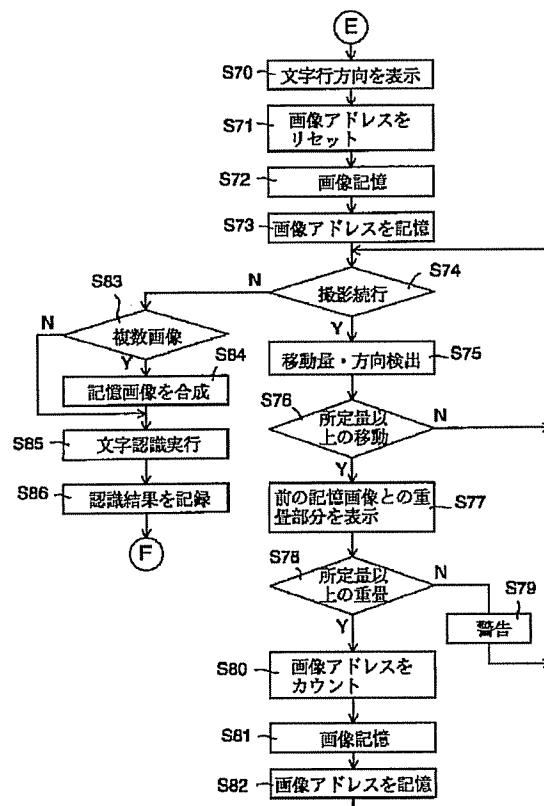
(A)撮影画像	(B)合成画像又は合成認識結果
<p>まみむめもやいうえよりる さしすせそたちつてとなにぬ なりつれろわゐうゑをあい なにぬねのはひふへほまみむ あいいうえおかきくけこさし ..... .....</p>	<p>あいいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ まみむめもやいうえよりるれろわゐうゑをあいいうえおかきくけこ さしすせそたちつてとなにぬねのはひふへほまみむめもやいうえよ よりつれろわゐうゑをあいいうえおかきくけこさしすせそたちつてと なにぬねのはひふへほまみむめもやいうえよりるれろわゐうゑお あいいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ まみむめもやいうえよりるれろわゐうゑをあいいうえおかきくけこ さしすせそたちつてとなにぬねのはひふへほまみむめもやいうえよ なりつれろわゐうゑをあい なにぬねのはひふへほまみむ ..... .....</p>

[Drawing 16]

認識結果

あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ  
まみむめもやいゆえよりるれろわゐうゑをあいうえおかきくけこ  
さしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよ  
らりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてと  
なにぬねのはひふへほまみむめもやいゆえよりるれろわゐうゑお  
あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ  
まみむめもやいゆえよりるれろわゐうゑをあいうえおかきくけこ  
さしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよ  
らりつれろわゐうゑをあいうえおかきくけこさしすせそたちつてと  
なにぬねのはひふへほまみむめもやいゆえよりるれろわゐうゑお  
.....  
.....

[Drawing 18]

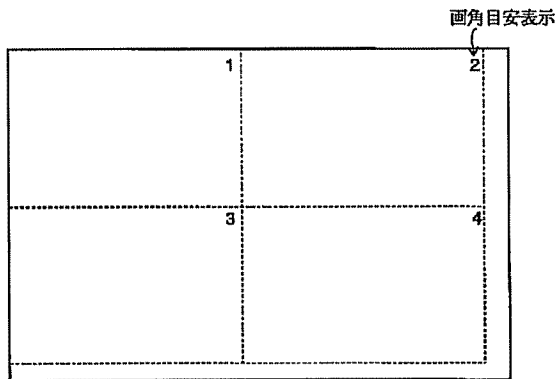


[Drawing 19]

原稿

あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ  
まみむめもやいゆえよりるれろわるうゑをあいうえおかきくけこ  
さしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよ  
りりつれろわるうゑをあいうえおかきくけこさしすせそたちつてと  
なにぬねのはひふへほまみむめもやいゆえよりるれろわるうゑを  
あいうえおかきくけこさしすせそたちつてとなにぬねのはひふへほ  
まみむめもやいゆえよりるれろわるうゑをあいうえおかきくけこ  
さしすせそたちつてとなにぬねのはひふへほまみむめもやいゆえよ  
りりつれろわるうゑをあいうえおかきくけこさしすせそたちつてと  
なにぬねのはひふへほまみむめもやいゆえよりるれろわるうゑを  
.....  
.....

[Drawing 20]



[Drawing 21]

あいうえおかきくけこさしす  
まみむめもやいゆえよりる  
さしすせそたちつてとなにぬ  
りりつれろわるうゑをあいう  
なにぬねのはひふへほまみむ  
あいうえおかきくけこさしす  
まみむめもやいゆえよりる  
さしすせそたちつてとなにぬ